

Abstract of the Disclosure

A current-perpendicular-to-the-plane (CPP) magnetoresistive sensor has additional layers for stabilizing the free layer against sense-current-generated magnetic fields. A ferromagnetic stabilizing layer is spaced from the free layer by a spacer layer and is exchange coupled with a second antiferromagnetic layer, the first antiferromagnetic layer being the conventional one for pinning the pinned layer in the CPP sensor. The stabilizing layer is in a vortex or other non-longitudinal magnetization pattern that is fixed by exchange coupling with the second antiferromagnetic layer. The stabilizing layer is also ferromagnetically coupled to the free layer across the spacer layer so that in the absence of both a sense current and an external magnetic field, the free and stabilization layers have similarly shaped vortex or other non-longitudinal magnetization patterns. The sense current generates a vortex magnetic field in the free layer opposite to the fixed vortex magnetization pattern in the stabilizing layer and essentially erases the effect of the vortex magnetization pattern in the free layer.